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Screening for psychosocial problems in 5–6-year olds: a randomised controlled trial of routine health assessments

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Abstract

Objective: Children's psychosocial problems are often not identified accurately. The present study addresses the effect of training of Child Health Doctors (CHDs) in a structured method to identify psychosocial problems on the accuracy of this identification in children aged 5–6. **Method:** The study was a randomised controlled trial (RCT) with a baseline and two follow-up measurements. A volunteer sample of 58 CHDs participated, randomly assigned to intervention or control condition. CHDs selected a population-based sample of 5–6-year-old children ($n = 6375$).

Results: The first follow-up showed that sensitivity had improved by 9% and specificity by 5% in the intervention condition, especially in children with severe problems (odds ratio = 3.7; 95% confidence interval: 1.2–11.8). The second follow-up showed a decrease in sensitivity and specificity in both conditions.

Conclusion: The training improves identification of psychosocial problems, especially severe ones, although the availability of time and resources also influences the accuracy with which psychosocial problems are identified.

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Keywords: Psychosocial problems; Screening; Training; Child Health Doctors

1. Introduction

Psychosocial problems, i.e., behavioural and emotional problems, are highly prevalent among children. Various studies have reported that prevalence ranges between 13 and 27% [1–6].

There is evidence that these problems may be reduced by secondary prevention programs and early treatment [7–11]. A review by Durlak et al. showed that both behavioural and cognitive-behavioural preventive interventions are effective treatments for children with psychosocial problems, for both internalizing and externalizing problems [7]. A review by Bryant et al. showed modest effects in parent-focused interventions, teacher-focused interventions, and child-

focused interventions for preschoolers with aggressive and disruptive behaviour [8]. While early treatment is wholly dependent on the accurate identification of children with psychosocial problems, identification procedures are currently too inaccurate [3–5,12,13]. In a previous study, Dutch Child Health Professionals (CHPs; i.e., doctors and nurses working in Preventive Child Health Care) identified no psychosocial problems in 43% of children whose parents had reported serious problems during routine health assessments [4]. This means that a lot of children with psychosocial problems lack early treatment or adequate support from CHPs [4]. Clearly, there is room for CHPs to improve their screening performance. Although there are several screening instruments for identifying psychosocial problems, identification of psychosocial problems remains inaccurate [14–18]. One reason for this is that physicians use these tools infrequently when screening psychosocial

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problems in children [19]. Furthermore, most of these instruments are parent-completed questionnaires and although these questionnaires provide reliable information, they can support but not replace the interview with the physician, in which a number of sources (parent, child, observation) are used to identify problems. According to Wildman et al., one of the best predictors of identification of psychosocial problems is whether mothers disclose concerns about their child's psychosocial functioning to the physician [20]. Disclosure of these concerns can be enhanced if physicians master some communication skills, but also if physicians are able to systematically categorize signals from parents and child regarding psychosocial problems [21]. Training physicians in these skills might help them to improve the identification of psychosocial problems [21,22].

While training might help them do so, there is no evidence on its effectiveness. Our study, therefore, set out to assess the effect of a structured method for systematically identifying psychosocial problems in children aged [5,6]. The method was developed by the Preventive Child Health Care Service in Breda, a city in the southern Netherlands, in cooperation with the psychology department of the University of Utrecht. An earlier non-experimental study in the Breda region had indicated that training CHPs in this method improved the identification of behavioural and emotional problems in children by CHPs [23].

The aim of the present study is to address the effect of training of Child Health Doctors (CHDs) in this structured method, on the accuracy of identification of behavioural and emotional (furtheron: psychosocial) problems, overall and for moderate and severe problems. In The Netherlands, preventive child health care is an important low-threshold service for the early identification of psychosocial problems in children. Such care is provided on an unsolicited basis to all children living in The Netherlands, by CHPs working in the Preventive Child Health Care Services. As part of this system, more than 90% of all children undergo three to four assessments by a CHP during their school careers [4]. Because part of these assessments involves an interview on psychosocial problems, the Preventive Child Health Services are an ideal setting for the early identification of psychosocial problems and for improving this identification.

2. Method

The study was designed as a randomised controlled trial (RCT) with a baseline and two follow-up measurements. After a baseline measurement lasting three months, CHDs in the intervention condition received the initial training. Participants in the control condition initially received no additional training, but were trained three months later than participants in the intervention condition, between the first and second follow-up measurement. CHDs in the intervention condition received a follow-up training between the first and second follow-up measurement. During each measure-

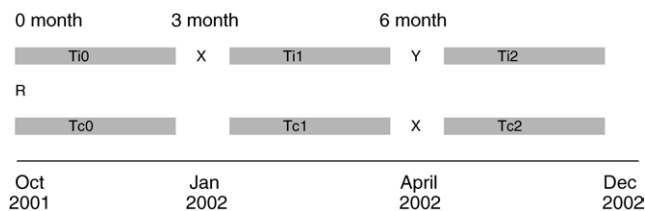


Fig. 1. Study design (R: randomization; X: initial training; Y: follow-up training; T: measurement period; i: intervention condition; c: control condition).

ment period, the participants screened a different group of fifty 5–6-year-old children. Fig. 1 shows the study design graphically. We report this study following the CONSORT criteria for RCTs [24].

2.1. Participants

After approval by the Medical Ethics Committee of TNO (Netherlands Organization for Applied Scientific Research), the trial took place from October 2001 to December 2002. The sample was obtained using a two-stage procedure. All Preventive Child Health Care Services in The Netherlands (at that time 43) were asked to provide Child Health Doctors (CHD) for the study. In total, 58 CHDs varying from one to six per Preventive Child Health Care Service participated. In the second stage, each of the participating CHDs had to provide a sample of one hundred and fifty 5–6-year-old children, with 50 children at each measurement period. They invited all children from two or three second grade primary school classes per measurement period.

2.2. Intervention

The intervention consisted of training CHDs in the structured method that was developed on the basis of the theory of Belsky [25]. This method enables a CHD to systematically categorize signals from parents and child regarding psychosocial problems, and also to equate parenting competencies with parenting workload.

The CHD has to register parental worries and presence of psychosocial problems on a form, covering 20 topics, for example relations with brothers/sisters, concentration, independence, anxiety. The form provides a quick summary of competence and workload regarding the various topics. The CHD systematically collects information about these topics by asking questions and by observing the child and the parent (or parents) and the interaction between child and parents. The CHD interprets the information in relation with the theory of Belsky and then makes a temporary diagnosis. If there are any clues for the presence of psychosocial problems or if parents are worried, the CHD is advised to examine the child in depth. Usually, there is no time for this during the periodical health examination, therefore, a follow-up should be planned. For the in-depth examination, the CHD uses four dimensions printed on the back of the

form: (1) social and material context of the parents (support of the partner, occupation of parents, etc.); (2) characteristics of parents (health, self-esteem, etc.); (3) interaction between parents and child (positive expressions, monitoring, etc.); (4) development of child (intelligence, social skills, etc.). In this study, we only evaluated the first phase of the intervention, i.e., making a quick summary, interpreting the information in relation with the theory of Belsky and making a temporary diagnosis.

For the present study, participating CHDs were trained in the initial examination as well as in the follow-up in-depth examination. The training consisted of two days of initial training followed by a further day's training three months later. CHDs were trained in groups of 15. The training method was based on social learning theory [26] and on evidence regarding effective staff-development programs [27].

A central part of the training was a videotape of three routine health assessments. The video showed how CHDs should use the structured method: how they should communicate with parents and children, how they should interpret the information from parents and children, how they should register problems on the form, and also how, in a follow-up examination, they should collect information about the four dimensions. During the initial training, CHDs discussed each part of the video after it was shown and performed exercises and role-plays. During the follow-up training, CHDs discussed their experiences with the structured method.

2.3. Outcomes

Primary outcome in this study was the concordance between the psychosocial problems identified by the CHD and the presence of parent-reported behavioural and emotional problems measured by the CBCL. This concordance was measured by calculating sensitivity and specificity. Sensitivity is the proportion of children correctly diagnosed by the CHD to have a psychosocial problem compared to all children with a clinical score on the CBCL (gold standard). Specificity is the proportion of children correctly diagnosed by the CHD *not* to have a psychosocial problem compared to all children with a normal score on the CBCL (gold standard).

The *Child Behavior Checklist* (CBCL/4–18) was used to assess the parent's report of the child's behavioural and emotional problems [28]; its reliability and validity, as established by Achenbach, were confirmed for the Dutch translation [28,29]. The CBCL consists of 20 competence items and 120 problem items; in this study, we used only the problem items.

The CHD completed a questionnaire (derived from previous studies) on the presence of psychosocial problems [4,15,30]. This contained the following question: "Does the child have a psychosocial problem at this moment? (Yes/No)". The CHD then had to allocate a code to each type problem on a precoded list. If a problem was identified, the

CHD was asked to rate its severity as mild, moderate, or severe.

The CHD also recorded the following socio-demographic variables: gender, family composition, siblings living in the family, as well as the parents' educational level, employment status, and ethnicity, the latter being based on the native country of the biological parents (to qualify as non-Dutch, at least one of them had to have been born outside The Netherlands). Finally, the CHD registered whether the child had been treated for psychosocial problems during the past twelve months.

All CHDs also completed a questionnaire concerning their own background, including their sex, age, working experience, previous training with regard to the identification of psychosocial problems, and the history of any collaboration on this subject with colleagues.

2.4. Procedures

The CBCL was mailed to parents, along with the standard invitation to attend a routine health assessment. Before the assessment took place, parents completed the CBCL and returned it to the CHD in a sealed envelope. The CHD mailed the sealed envelopes to the research institute, where cases were allocated to a normal range or a clinical range of the scoring distributions of the CBCL Total Problems score based on the Dutch sample [29]. Cut-offs were set at the 90th percentile for the age and gender group.

Immediately after each assessment, the CHD completed the questionnaire on the presence of psychosocial problems and socio-demographic variables. At baseline, all CHD completed a questionnaire concerning their own background.

2.5. Quality assurance of measurements

To enhance the quality of measurements, all participating CHDs received half a day's training on research procedures preceding the start of the first measurement period. Completed questionnaires were also checked immediately. If there were any errors, or any information was missing, CHDs were contacted to correct this.

2.6. Calculation of sample size

We designed the trial to detect any improved accuracy of identification of psychosocial problems that would result in an increase in sensitivity of 10% with equal specificity of the CHDs' evaluation relative to the CBCL. This corresponds with an odds ratio of 2 with 90% power at $\alpha = 0.05$. For this, we needed 32 CHDs per condition, each providing at least 50 children per measurement period.

2.7. Assignment

CHDs were randomised at Preventive Child Health Care Service level either to the intervention condition (i.e.,

training) or to the waiting-list condition (i.e., they received training three months later). They were randomised in blocks of two Preventive Child Health Care Services, which were ranked by the number of participating CHDs in the Service so as to prevent contamination within a service.

Parents and children were not aware of the study condition to which their CHD had been allocated. CHDs could not be blinded. CHDs mailed the sealed envelope that contained the CBCL filled out by parents to the research institute.

2.8. Analysis

First, we used *t*-tests, chi-square tests and Fisher exact tests to assess differences in background between CHDs in the intervention condition and control condition. Next, we calculated the sensitivity and specificity of identification by condition and measurement periods, and assessed differences between the intervention condition and control condition regarding changes in sensitivity and specificity between baseline and follow-up measurements. For the latter, we used multiple logistic regression analyses. Because of the expected clustering of individual data by CHD, the regression analyses were all performed with multilevel techniques [31,32].

We restricted the analysis to children for whom both complete CBCL and doctor data were available (91% of the respondents). We conducted these analyses for all children with psychosocial problems identified by CHDs and again solely in the subgroup of children that CHDs had identified as having moderate or severe problems. We excluded two other groups of children: those who had received treatment for psychosocial problems in the past twelve months, since this required no early identification by CHDs; and those of non-Dutch origin, as identification of psychosocial problems by CHDs among them has been shown to be hindered by communication problems [33].

3. Results

3.1. Sample and program attendance

Fig. 2 shows the participant flow and number of children in each measurement period. In all, 58 CHDs participated; on average, due to maternity-leave, change of job, illness, and other factors, they saw fewer children than planned. Table 1 shows the characteristics of participating CHDs. The high percentage of female CHDs is similar to all Dutch CHDs. No differences were found between CHDs in the intervention condition and control condition, except that CHDs in the control condition worked at branches of the Preventive Child Health Care Services where more meetings were organized for discussing psychosocial problems in children.

Table 1
Characteristics of participating CHDs

	Intervention condition (<i>n</i> = 28)	Control condition (<i>n</i> = 30)
Female (%)	75.0	86.7
Age: mean (S.D.)	42.1 (9.5)	41.0 (9.1)
No. of years working as a doctor: mean (S.D.)	13.4 (8.2)	11.7 (8.2)
No. of CHDs working at service: mean (S.D.)	12.3 (6.0)	11.6 (3.7)
Trained in identifying psychosocial problems, last 5 years (%)	59.3	48.3
Practiced identifying psychosocial problems in all children of 5–6 years, last 5 years (%)	96.4	90.0
Meeting with colleagues concerning psychosocial problems at least once a year (%)	14.8	43.3 ^a
Participated in training during working hours (%)	75.0	73.3
No. of CHDs with at least 50 children in every period	6	6
No. of CHDs with at least 40 children in every period and less than 50 in 1 or more periods	10	14
No. of CHDs with children in periods 1–3	27	28
No. of CHDs with children in periods 1 and 2	28	28

^a Fisher's exact test: *p* = .009; all other differences were not statistically significant (*p* > .05).

Table 2 presents characteristics of the children participating in the study. Over the three measurement periods, the number of children per measurement period decreased. However, for both conditions, the response rate increased over the three measurement periods ($X^2 = 11.0$; *p* = .004). No differences in background characteristics were found between participating children and non-participating children.

All participating CHDs attended the two-day initial training and the follow-up training, except for one CHD in the control condition who did not attend the second day of the initial training.

3.2. Prevalence and identification of psychosocial problems

Table 3 shows that the proportion of children that scored in the clinical range of the Total Problems scale was highest among children in the second follow-up measurement ($X^2 = 4.76$; *p* < .001). There were no differences between children in the intervention and control conditions. Neither were there any effects due to interaction between measurement period and condition.

Table 3 shows that sensitivity improved and specificity remained the same in CHDs in the intervention condition after they had been trained. Sensitivity also improved slightly in CHDs in the control condition, whereas

Table 2
Characteristics of children participating in the study

	T0		T1		T2	
	Intervention (n = 1122)	Control (n = 1130)	Intervention (n = 1043)	Control (n = 1020)	Intervention (n = 923)	Control (n = 1137)
Males (%)	48.7	49.6	51.9	52.5	49.0	48.8
Aged 5–6 years (%)	93.9	93.2	96.0	96.7	93.8	94.0
At least one parent high educated (%)	82.7	82.0	80.6	79.2	81.1	82.4
Parents working > 32 h a week (added up) (%)	84.8	90.3	89.5	95.0	84.5	89.2
One-parent households (%)	4.7	6.0	3.7	4.0	5.9	4.8
Number of siblings						
0	11.2	10.3	14.1	11.5	18.4	17.8
1	57.0	55.2	55.5	52.7	49.3	50.3
>1	31.8	34.5	30.4	35.8	32.3	31.9
Response rate	85.3	82.7	51.9	82.9	87.8	86.7

Percentages may not add up to 100% because of round up/down.

specificity decreased. Comparison of change in both sensitivity and specificity between trained and non-trained CHDs showed that trained CHDs achieved greater improvement in identifying psychosocial problems in children than non-trained CHDs, but differences were not statistically significant (odds ratio = 2.1; 95% confidence interval (CI) = 0.7–6.2). Making the same comparison for children with moderate and severe problems (39% of all children in whom the CHD identified psychosocial problems) and thus excluding children with mild problems, differences were larger and statistically significant, meaning that trained CHDs achieved greater improvement in identifying moderate and severe psychosocial problems than non-trained CHDs (OR = 3.7; 95% CI = 1.2–11.8). After training CHDs in the control condition and follow-up training in the intervention condition, sensitivity and specificity decreased in both conditions. However, CHDs in the intervention condition, who worked with the method for a longer period, still performed better than CHDs in the control condition.

4. Discussion and conclusion

This is the first study to examine the effects of training Child Health Doctors (CHDs) to use a structured method for screening psychosocial problems in children aged 5 or 6. The results show that CHDs who took the training identified moderate and severe psychosocial problems more accurately than CHDs who did not. However, the accuracy of the detection of the entire range of problems, including the mild ones, did not improve with statistical significance in the trained group. A likely explanation for this effect is that training in this method provided CHDs with tools and skills that enabled them to identify psychosocial problems in a more structured way. Besides, the method focuses not only on the child, but also on parents' stress and worries regarding that child. According to Belsky, parenting is influenced by several factors: not only the personal characteristics of the

child and the parents, but also the parents' marital relationship, their work, and their wider social network [25]. In the training, CHDs learned how to identify psychosocial problems in the child, focusing not only on the child, but also on the parents. This should allow the CHD to identify psychosocial problems more effectively.

4.1. Methodological considerations

This study has some methodological shortcomings, which might have biased our results. However, we believe that these methodological shortcomings probably have led to underestimate the real effects of the training as will be argued below.

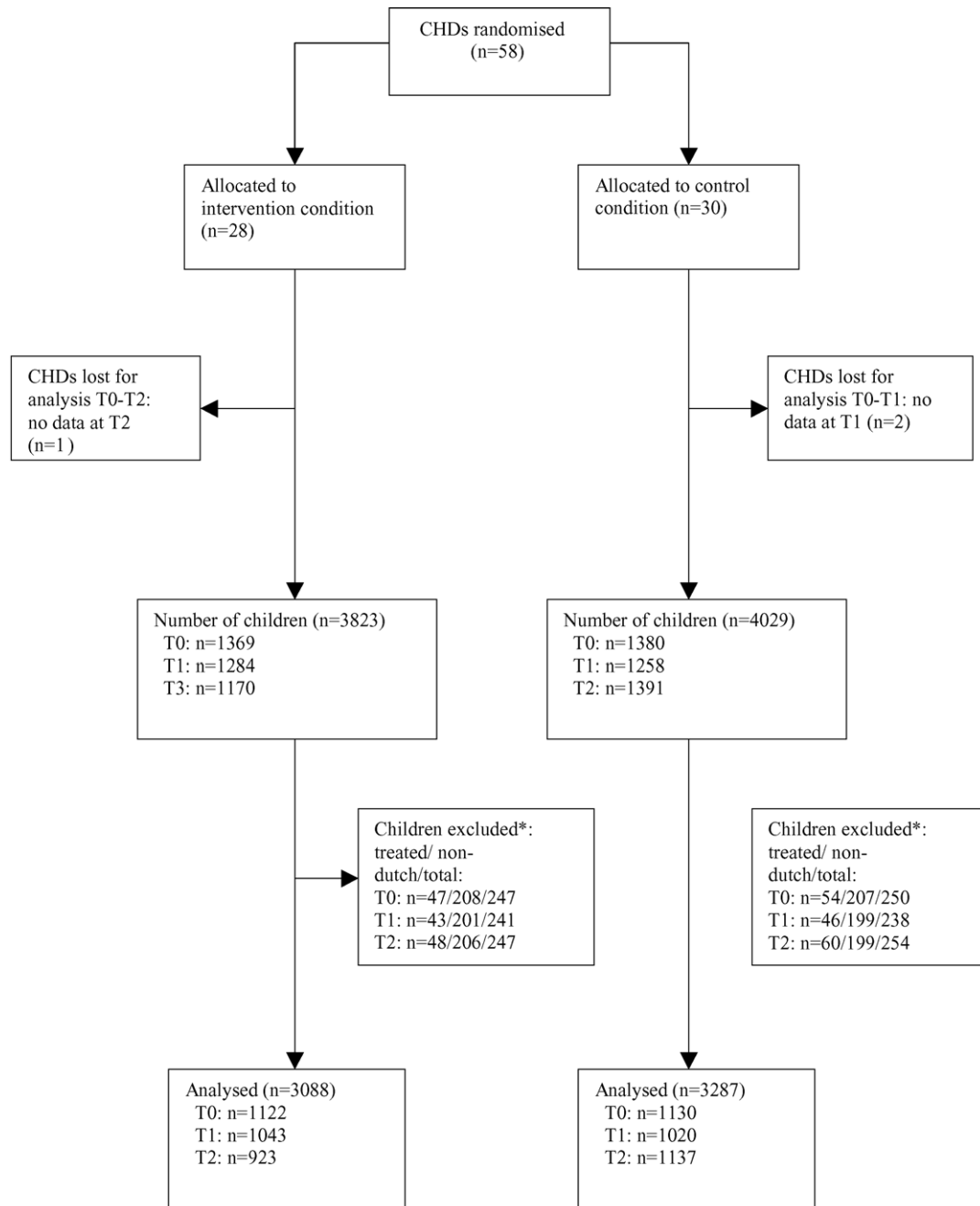
Our outcomes may have been affected by the use of the CBCL as a reference for the accuracy with which psychosocial problems were identified. The CBCL aims to detect psychiatric morbidity, whereas CHDs aim at a broader range of psychosocial problems. Mild psychosocial problems are probably not detected by the CBCL, but may be identified by the CHD. The consequence is that if CHDs identify more children with mild psychosocial problems, specificity may decrease, because these problems are not detected by the CBCL. This will have no impact on effect sizes found in an RCT but it may add measurement error in such a study. However, the CBCL is well-validated and well-adapted to Dutch conditions, and has thus become the Dutch standard for measuring behavioural and emotional problems in children [29]. As such, while still imperfect, it is the gold standard. Moreover, any bias in outcome measures would affect baseline and follow-up measurements in both conditions.

The statistical power of the study was lower than planned. Instead of 64 CHDs, we recruited only 58. We aimed at an odds ratio of 2, which was achieved, but was not significant because of the loss of power. Participating in the present study was time-consuming for CHDs: although using the structured method did not take extra time, research activities took 10 min extra for every child included. It was difficult to

Table 3
Presence of psychosocial problems according to parents and CHD, sensitivity and specificity: excluding non-Dutch and children already treated

	Intervention condition					Control condition					Differences in changes between intervention and control condition (95% CI)	
	T0 (n = 1122)	T1 (n = 1043)	T2 (n = 923)	T1 – T0 ^a	T2 – T0 ^a	T0 (n = 1130)	T1 (n = 1020)	T2 (n = 1137)	T1 – T0 ^a	T2 – T0 ^a	T1 – T0	T2 – T0
CBCL (%clinical total problem score)	7.3	6.4	7.9			6.1	6.3	8.0				
CHD identified psychosocial problems (%)	28.3	28.8	24.4			23.2	27.1	30.9				
Sensitivity												
All problems	54.9	70.1	45.2	15.2	–9.7	59.4	65.6	56.0	6.2	–3.4	9.0	–6.3
Moderate/severe problems	30.5	50.7	21.9	20.2	–8.6	39.1	31.3	24.2	–7.8	–14.9	28	6.3
Specificity												
All problems	73.8	74.1	77.4	0.3	3.6	79.2	75.5	71.3	–4.7	–7.9	5.0	11.5
Moderate/severe problems	91.3	91.5	91.6	0.2	0.3	93.5	93.8	92.3	0.3	–1.2	–0.1	1.5
Odds ratio												
Overall problems (95% CI)											2.1 (0.7–6.2)	1.6 (0.6–4.2)
Moderate and severe problems (95% CI)											3.7 (1.2–11.8)	2.1 (0.6–6.6)

^a Changes.



* First two categories do not add up to 'total' because some children under treatment were of non - Dutch origin.

Fig. 2. Participant flow and follow-up.

find CHDs who wanted to participate in the study: most of them already had a high workload and did not have time to participate.

Due to external circumstances, participating CHDs also saw fewer children than they were supposed to. Instead of the 3200 children needed per measurement period, they saw a mere 2000, further weakening the power of the study. Although this meant that the main effect of the study was not statistically significant, it was estimated to be similar to the

intended effect (an increase in sensitivity of 10% with unchanged specificity).

For practical reasons, data collection was restricted to the CHD's initial examination with the parent and the child, during which a CHD has little time to identify psychosocial problems. This is important: after a follow-up examination, a CHD's identification of psychosocial problems may be more accurate, as he or she then makes full use of the structured method. Because the follow-up was excluded from our

study, our findings may therefore have underestimated the full effects of this method.

The study showed that the accuracy of identification decreased in both conditions during the second follow-up measurement period. This may be due to an overall decrease in attention paid to the method after some time or to a very specific lack of time among CHDs during this period. Regarding the former explanation, results during the first two measurements may have been better than in routine care due to more attention, whereas during the third measurement, it becomes routine again. Regarding the second explanation, during this third measurement all CHDs had to participate in the Dutch national meningococcus C vaccination program, in which all Dutch children aged 1–19 years had to be vaccinated. Because of this, CHDs had little time for other activities, including the collection of data for the present study. Both explanations may hold and affected CHDs in both conditions.

Finally, the sample of the present study is characteristic of the Dutch CHD population. CHDs from 25 of the 43 Preventive Child Health Care Services participated. The participating services were well spread over The Netherlands, with big-city services participating as well as ones in rural areas. However, children of non-Dutch origin were excluded from the analysis: to these, the findings of the present study could not be applied, as the identification of psychosocial problems in such children has shown to be hindered by communication problems [33].

4.2. Practice implications

Our study indicates that Preventive Child Health Services can improve the accuracy of identification of moderate and severe psychosocial problems when CHDs are trained in the structured method. However, sensitivity and specificity percentages are still not optimal. We also saw that, in the long run, the accuracy of identification decreased. This shows that attention has to be paid to the continuation of the method in routine care; for instance, by making it easier to register the findings, such as a computerised version.

Furthermore, the method could be applied by paediatric nurse practitioners as well, who may have more time available to apply the method. In The Netherlands, they specifically focus at psychosocial development at some of their preventive contacts with children. In other countries, they may perform routine assessments for the early detection of psychosocial problems as well, which may be a promising option for the early treatment of such problems.

4.3. Implications for research

Our results show that training in a structured method to identify psychosocial problems that includes a checklist covering the various domains relevant for child mental health may improve identification of moderate and severe problems in the short term. Additional research is needed on

methods to promote the impact of such training in the longer term, including the assessment of organisational factors in Child Health Services. The lower accuracy recorded at the second follow-up calls for further research on the optimal conditions within the Preventive Child Health Care Services for early identification in general. Additional information is further needed on the relative merits of training professionals compared with other methods to improve early detection of psychosocial problems. Examples of these concern the use of short symptom checklists that parents fill out before the assessment [17,34], use of several informants like parents and day-care providers or teachers [35], reserving more time per visit, and use of computerized adaptive testing and Item Repsonse Theory [36,37].

Although our study shows that accuracy in identifying moderate and severe psychosocial problems improved, it is not clear what exactly caused it to do so. Three elements are essential to the structured method: the systematic collection of information about the child and the parents, the systematic registration of this information, and its systematic interpretation. The relative importance of these elements should be assessed in further research, which would thereby examine the added value of the follow-up examination. The considerable burden of mental diseases in children and adults suggests that large gains may be made.

Our study is the first to formally examine the effects of additional training of professionals to improve their skills in identifying psychosocial problems; its results show that this may add to really obtaining the potential health gains in this field.

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References

- [1] Costello EJ, Pantino T. The new morbidity: who should treat it? *J Dev Behav Pediatr* 1987;8:288–91.
- [2] Horwitz S, Leaf PJ, Leventhal JM, Forsyth B, Speechley K. Identification and management of psychosocial and developmental problems in community-based, primary care pediatric practices. *Pediatrics* 1992;89:480–5.
- [3] Kok C, van Wezel P, Maarsingh EF, Vogels T, Lako CJ. Signaleren van psychosociale problematiek bij adolescenten. Het Preventief Gezondheidsonderzoek en een vragenlijst vergeleken. [Identification of psychosocial problems in adolescents. The routine health assessment compared to a questionnaire]. *Tijdschrift voor Sociale Gezondheidszorg* 1994;72:363–8.
- [4] Brugman E, Reijneveld SA, Verhulst FC, Verloove-Vanhorick SP. Identification and management of psychosocial problems by preventive child health care. *Arch Pediatr Adolesc Med* 2001;155:462–9.
- [5] Glascoe FP. Detecting and addressing developmental and behavioural problems in primary care. *Pediatr Nurs* 2000;26:251–7.

- [6] Navon M, Nelson D, Pagano M, Murphy M. Use of the pediatric symptom checklist in strategies to improve preventive behavioral health care. *Psychiatr Serv* 2001;52:800–4.
- [7] Durlak JA, Wells AM. Evaluation of indicated preventive intervention (secondary prevention) mental health programs for children and adolescents. *Am J Community Psychol* 1998;26:775–802.
- [8] Bryant D, Herndon Vizzard L, Willoughby M, Kupersmidt J. A Review of interventions for preschoolers with aggressive and disruptive behavior. *Early Educ Dev* 1999;10:47–68.
- [9] Hemphill SA, Littlefield L. Evaluation of a short-term group therapy program for children with behavior problems and their parents. *Behav Res Ther* 2001;39:823–41.
- [10] Elliot J, Prior M, Merrigan C, Ballinger K. Evaluation of a community intervention programme for preschool behaviour problems. *J Pediatr Child Health* 2002;38:41–50.
- [11] Dadds MR, Barrett PM. Practitioner review: psychological management of anxiety disorders in childhood. *J Child Psychol Psychiatr* 2001;42:999–1011.
- [12] Costello EJ, Edelbrock C, Costello AJ, Dulcan MK, Burns BJ, Brent D. Psychopathology in pediatric primary care: the new hidden morbidity. *Pediatrics* 1988;82:415–24.
- [13] Lavigne JV, Binns HJ, Christoffel K, Rosenbaum D, Arend R, Smith K, Hayford JR, McGuire PA. Behavioral and emotional problems among preschool children in pediatric primary care: prevalence and pediatricians' recognition. *Pediatrics* 1993;91:649–55.
- [14] Jellinek MS, Murphy JM, Little M, Pagano ME, Comer DM, Kelleher KJ. Use of the pediatric symptom checklist to screen for psychosocial problems in pediatric primary care: a national feasibility study. *Arch Pediatr Adolesc Med* 1999;153:254–60.
- [15] Reijneveld SA, Vogels AG, Brugman E, van Ede J, Verhulst FC, Verloove-Vanhorick SP. Early detection of psychosocial problems in adolescents: how useful is the Dutch short indicative questionnaire (KIVPA). *Eur J Public Health* 2003;13:152–9.
- [16] Wren FJ, Scholle SH, Heo J, Comer DM. Pediatric mood and anxiety syndromes in primary care: who gets identified? *Int J Psychiatry Med* 2003;33:1–16.
- [17] Vogels T, Reijneveld SA, Brugman E, den Hollander-Gijsman M, Verhulst FC, Verloove-Vanhorick SP. Detecting psychosocial problems among 5–6-year-old children in preventive Child Health Care: The validity of a short questionnaire used in an assessment procedure for detecting psychosocial problems among children. *Eur J Public Health* 2003;13:353–60.
- [18] Jones RN, Latkowski ME, Green DM, Ferre RC. Psychosocial assessment in the general pediatric population: multiple-gated screening and identification procedure. *J Pediatr Health Care* 1996;10:10–6.
- [19] Gardner W, Kelleher KJ, Pajer KA, Campo JV. Primary care clinicians' use of standardized tools to assess children's psychosocial problems. *Ambul Pediatr* 2003;3:191–5.
- [20] Wildman BG, Stancin T, Golden C, Yerkey T. Maternal distress, child behaviour, and disclosure of psychosocial concerns to a paediatrician. *Child Care Health Dev* 2004;30:385–94.
- [21] Wissow LS, Roter DL, Wilson ME. Pediatrician interview style and mothers' disclosure of psychosocial issues. *Pediatrics* 1994;93:289–95.
- [22] Ringeisen H, Oliver KA, Menvielle E. Recognition and treatment of mental disorders in children: considerations for pediatric health systems. *Paediatr Drugs* 2002;4:697–703.
- [23] de Wijs JPM, Kroesbergen HT, de Bruijn AJM, Gunning-Schepers LJ, Ingleby JD. Preventie van psychosociale problematiek in de jeugdgezondheidszorg (III). Signalering bij 5-en 6-jarige basisschoolkinderen. [Prevention of psychosocial problems in child health care (III). Identification in 5–6-year olds]. *Tijdschrift voor Sociale Gezondheidszorg* 1997;75:305–8.
- [24] Begg C, Cho M, Eastwood S, Horton R, et al. Improving the quality of reporting of randomized controlled trials. The CONSORT statement 1996;276:637–639 [PMID: 8773637].
- [25] Belsky J. The determinants of parenting: a process model. *Child Dev* 1984;55:83–96.
- [26] Bandura A. Social foundations of thought and action: a social cognitive theory. Englewood Cliffs: Prentice-Hall; 1986.
- [27] Joyce B, Showers B. Student achievement through staff development. New York: Longman; 1988.
- [28] Achenbach TM. Manual for the child behavior checklist/4–18 and 1991 profile. Burlington: Department of Psychiatry, University of Vermont; 1991.
- [29] Verhulst FC, Van der Ende J, Koot HM. Handleiding voor de CBCL/4–18 [manual for the CBCL/4–18]. Rotterdam: Department of Child and Adolescent Psychiatry, Erasmus University, Sophia Children's Hospital; 1996.
- [30] Harland P, Reijneveld SA, Brugman E, Verloove-Vanhorick SP, Verhulst FC. Family factors and life events as risk factors for behavioural and emotional problems in children. *Eur Child Adolesc Psychiatr* 2002;11:176–84.
- [31] Goldstein H. Multilevel statistical models. London: Edward Arnold; 1995.
- [32] Goldstein H, Rasbash J, Plewis I. A user's guide to MLwiN. London: Multilevel Models Project, University of London; 1998.
- [33] Reijneveld SA, Harland P, Brugman E, Verhulst FC, Verloove-Vanhorick SP. Identification by child health professionals of psychosocial problems among native and non-native children: does ethnic background have an impact? *Pediatr Res* 2002;51:1125 [abstract].
- [34] Carter AS, Briggs-Gowan MJ, Jones SM, Little TD. The infant-toddler social and emotional assessment (ITSEA): factor structure, reliability, and validity. *J Abnorm Child Psychol* 2003;31:495–514.
- [35] Goodman R, Ford T, Simmons H, Gatward R, Meltzer H. Using the strength and difficulties questionnaire (SDQ) to screen for child psychiatric disorders in a community sample. *Br J Psychiatry* 2000;177: 534–9.
- [36] Wainer H (editor). Computerized adaptive testing, A primer. Hillsdale; 1990.
- [37] van Buuren S, Hopman-Rock M. Revision of the ICIDH severity of disabilities scale by data linking and item response theory. *Stat Med* 2001;20:1061–76.